Historia naturalis bulgarica, 14, 2002: 123-140

Status of the Marbled polecat (*Vormela peregusna peregusna* Guldenstaedt) in Western and North-eastern Bulgaria and data on the status of its potential main prey and competitors

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Introduction

The objectives of this study are framed by the conservation significance of the European Marbled polecat and are related to its study and conservation in Bulgaria.

The European Marbled polecat (*Vormela peregusna peregusna* Guldenstaedt) is included in the 1996 and the 2000 IUCN Red Lists of Threatened Species as a vulnerable (VU) subspecies. At present, the biology, ecology and ethology of the species are poorly studied. It occurs in habitats actively utilised by man - the open landscapes - the conditions of which are constantly deteriorating. This species is typical of the Central Asian fauna, while for Europe it is a rare steppe element of a limited distribution (SPASSOV & SPIRIDONOV, 1993; MITCHELL-JONES et al., 1997). It is assumed that Europe is inhabited by one subspecies - *Vormela peregusna peregusna* Guldenstaedt, 1770 (= *V. p. euxina*), characterised by less distinct lighter spots on its body (SPASSOV & SPIRIDONOV, 1993).

The ecology and biology of the Marbled polecat, especially of the European subspecies, are inadequately studied while the knowledge about them is essential to the conservation of the species population (KORNEEV, in press). The Russian polecat (*Mustela eversmanni*) and in a number of cases the Stone marten (*Martes foina*) are considered to be very strong competitors to the Marbled polecat in Europe. The habitats of the species are largely related to the distribution of the large colonial rodents, which are the optimal prey for the species, in terms of size (SPASSOV & SPIRIDONOV, 1993).

In the last 200 years the species has probably retreated by 1,000 km eastwards in the territory of the former Soviet Union and, according to some data, subsequently disappeared from the Hungarian steppe more than a century ago (HEPTNER et al., 1967). At present, the species seems to form two sub-populations in Europe, that have recently been fragmented:

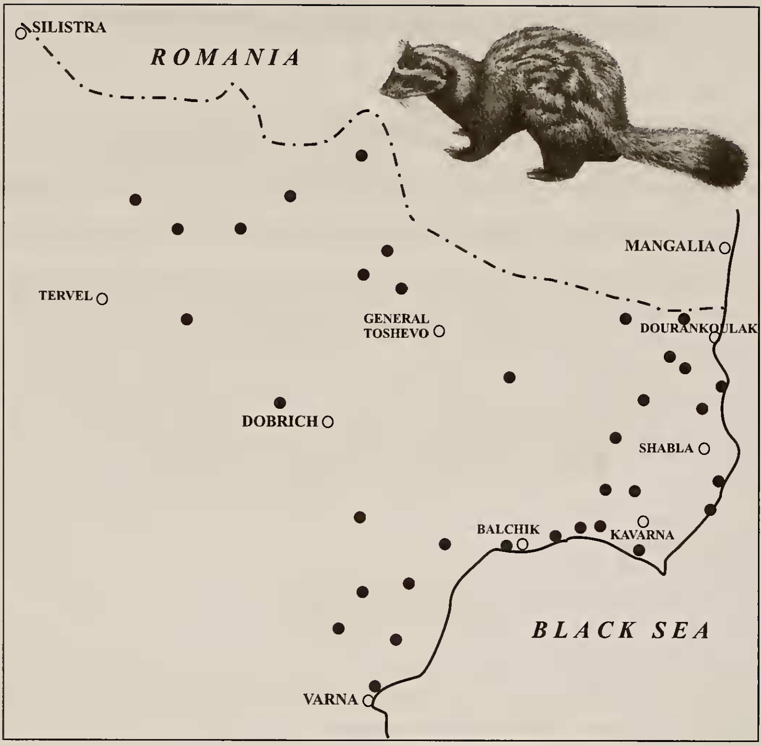


Fig. 1. Distribution of the Marbled polecat (*Vormela peregusna*) in Dobrudja after the questionnaire

1. The Balkan Peninsula (without its southern and western parts) sub-population: Romanian Dobrudja, Bulgaria, the European part of Turkey, Northern Greece, the Republic of Macedonia, Serbia, Southern Dalmatia, and possibly Albania.
2. The Northern Black Sea coastline sub-population: Ukraine, where the range seems to be fragmented in the region of Odessa.

According to some data the species still exists in Moldova (ROBINSON, 1997 - Draft Report of the European Vormela Project of IUCN/SSC), but other authors believe that the species has been extinct from Moldova (AVERIN et al., 1979; HAHIN, 1985). Obviously, additional studies are needed. Anyway, even if the species still exists in Moldova, it will be just an isolated micro-population. According to the Red Data Book of the former USSR (HAHIN, 1985), less than a hundred breeding individuals occur in fragmented habitats in Ukraine Apparently, the "populations" of *V. peregusna peregusna* on the Balkans and along the northern coastline of the Black Sea are already fragmented. The species is rare everywhere within this range (SPASSOV & SPIRIDONOV, 1993).

In Bulgaria the species is included in the Red Data Book, as special protection measures on the European level were proposed, in view of the quite critical status of the population on the continent (SPASSOV & SPIRIDONOV, 1985).

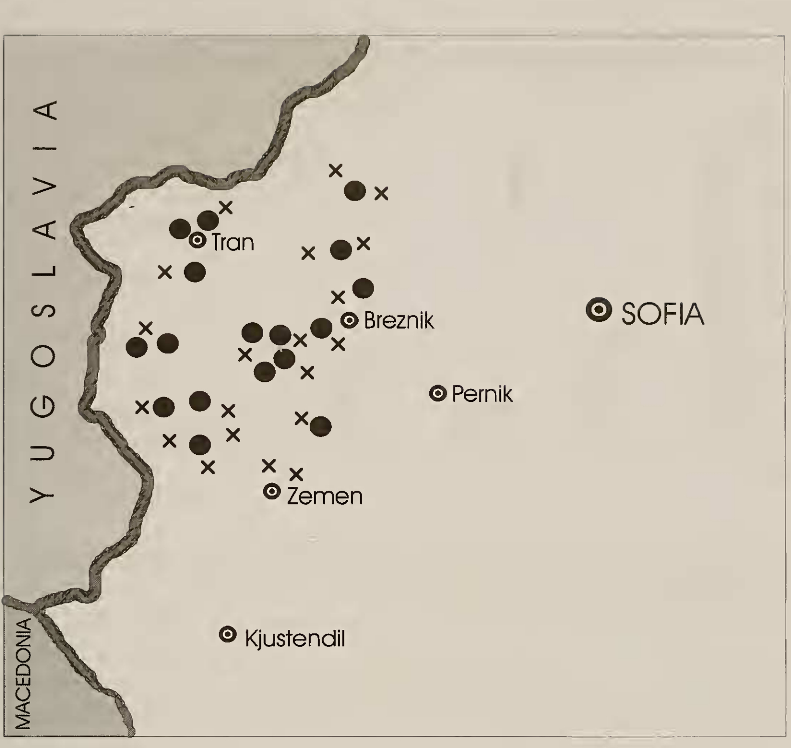


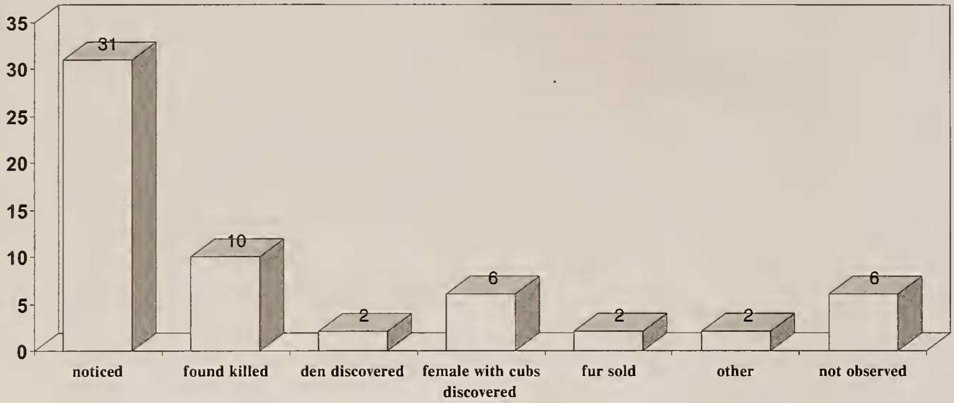
Fig. 2. Distribution of the Marbled polecat (*Vormela peregusna*) - ● and European souslik (*Spermophilus citellus*) - ✕ in the investigated region of Western Bulgaria

It is considered that the species has a mosaic distribution in the country. It is rare everywhere and its status is poorly studied. It is supposed that the population number is the highest in the Bulgarian and Romanian parts of Dobrudja (and the adjacent part of North-eastern Bulgaria), as well as in the Western Bulgaria and Southern Serbia (SPASSOV & SPIRIDONOV, 1993; MILENKOVICH et al., 2000). Bulgaria is at the centre of the range of the most numerous sub-population - the Balkan sub-population. Most data about the occurrence species is reported exactly from this region. Therefore, the conservation of the Marbled polecat in the country is of strategic importance for its preservation in Europe in general (SPIRIDONOV & SPASSOV, 1998).

As already mentioned, given the critical status of the population in Europe, the Bulgarian Red Data Book (1985) recommends special conservation measures to be taken on European level. The problems of the status and the conservation of the Marbled polecat have found a special place in the Action Plan for the Small Carnivores elaborated by IUCN/SSC Mustelidae and Viveridae Specialist Group (SCHREIBER et al., 1989). Conservation measures on national or regional levels are proposed in Appendix 2 of this Plan. It is recommended to study the marbled and the Russian polecat within their European distribution range because of the reduction of both their populations and steppe habitats.

Recently the EEP Small Carnivore Advisory Group - IUCN/SSC Mustelidae, Viverridae and Proccyonidae Specialist Group - have undertaken

Fig. 3. If you saw a Marbled polecat in your region, please indicate:



the elaboration of European Action Plan for the conservation of this carnivore species (ROBINSON, 1996).

Methods

The method of questionnaires was chosen as the leading approach. In spite of some disadvantages (inability for direct control of the reliability of all the answers) this method is suitable for studying species which are difficult to observe but have characteristic features. For a greater reliability of the results, the questionnaires were distributed among the hunters who may be considered as the group having the best knowledge among the local population.

The questionnaires consist of 17 questions to which drawings of the species and data on their sizes were added, to facilitate their identification. The questions included: availability of data on the species' occurrence in the given region; how this data was obtained; how the occurrence of the animal was registered (by direct observation, animal's fir seen, den noticed, etc.); availability of data on the historical range of the species; what is the type of habitats; what are the reasons for extermination; statistical data about the respondents (see the figures). The questions aimed at studying the past and the present distribution and the relative number of the Marbled polecat, its habitats, the negative factors and other mammalian species related to its biology. It is also important that a number of these species are by themselves species of conservation importance included in the Bulgarian Red Book or the 1996 and 2000 IUCN Red Lists:

Species	Red Book of Bulgaria	1996 and 2000 IUCN Red Lists	
European Marbled polecat (*Vormela peregusna peregusna*)	+	VU	
Russian polecat (*Mustela eversmanni*)	+	-	main
European polecat (*Mustela putorius*)	-	-	probable
Stone marten (*Martes foina*)	-	-	competitor's
Common hamster (*Cricetus cricetus*)	+	-	main prey
Newton's hamster (*Mesocricetus newtoni*)	+	VU	(large colonial
European souslik (*Spermophilus citellus*)	-	VU	rodents)

The questionnaires were sent in 1996 by mail to all settlements (more than 200) in Southern Dobrudja (NE Bulgaria). Eventually, answers from 90 settlements were received - which is about 45% of the questionnaires sent out.

In parallel, questionnaires[1] were sent to the scarcely populated, hilly and semi-open areas of Western Bulgaria - west of Sofia in the region just west of Pernik to the border with Serbia and from Zemen (to the south) to Dragoman (to the north). The survey in the Western Bulgaria was carried out in the beginning of 1997 through personal interviews in some 40 settlements, therefore the answers to the questionnaire are 100%.

The main material - the data collected through the questionnaire survey was processed by a statistical computer software - SPSS. The proportions of the different answers to the same questions, as well as that of the answering and not answering respondents' number were calculated. The relationships between the different questions and their answers were analysed. Comparative analysis was carried out through comparing the numerical and graphic expressions of the data collected.

Results and discussion

The Marbled polecat and the other small carnivores

Status of the Marbled polecat. The positive answers give a satisfactory picture of the population distribution and density in both Southern Dobrudja and Western Bulgaria during 1996 and 1997 (Fig. 1 and 2) which makes us believe that the species still maintains a sufficiently viable population in these optimal habitats. This finding is promising and eliminates the concern that the population is in a critical state everywhere in the Balkans. This

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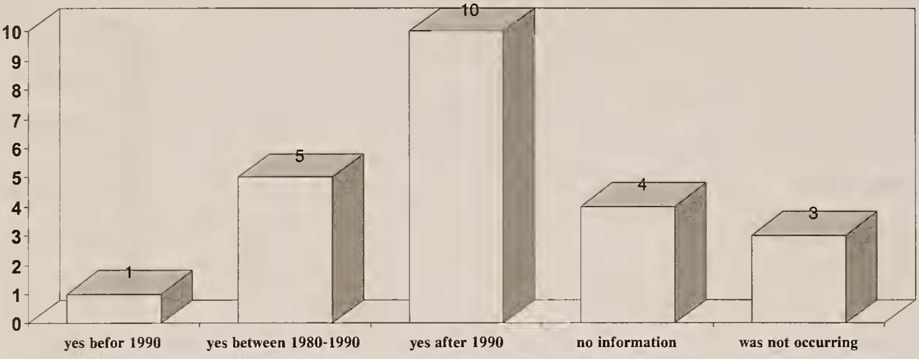
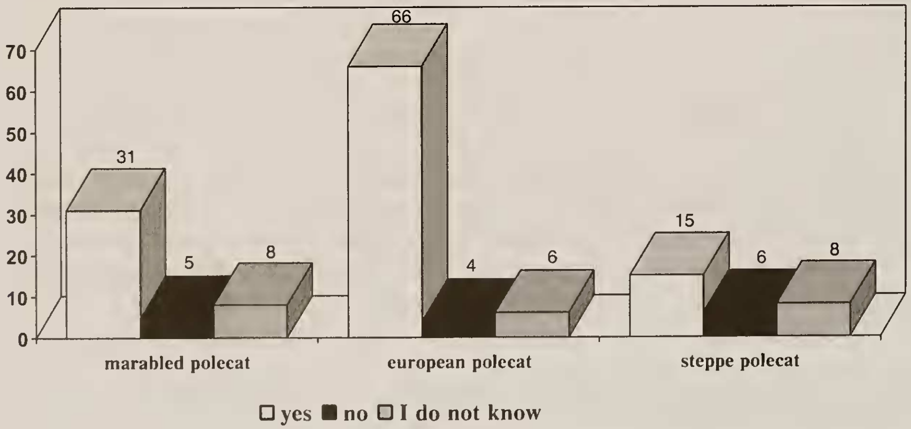
[1] with a reduced number of questions because of the specific conditions and the characteristics of the fauna.

Fig. 4. Do you have information about the past occurence of Marbled polecat in your region?



conclusion is supported by the data according to which most of the reports refer to live animals (Fig. 3) and by the recent reporting of the occurrence of the species which date back mostly to the last decade - since 1990 (Fig. 4). It should be noted that the graph of the distribution of this, as well as of the other species, depends on the method of dissemination of the questionnaires. The questionnaires along the Black Sea coastline involved personal interviews and answers were received in all the settlements, while in the Central Dobrudja the questionnaires were mailed and not all the respondents answered. The positive answers about the presence of the Marbled polecat in both Dobrudja and Western Bulgaria (west of Pernik) are considerably more than 50% (31 answers of all the 44 responding, including the positive, negative and uncertain presence answers) (Fig. 5). It should be added that the lack of observation in this case is not a guarantee for the absence of the species in a region. The population appears to be the largest along the Black Sea coastline, but this may also be due to the fact that the answers there were

Fig. 5. Do you have data on the occurrence of any of these species in your region?



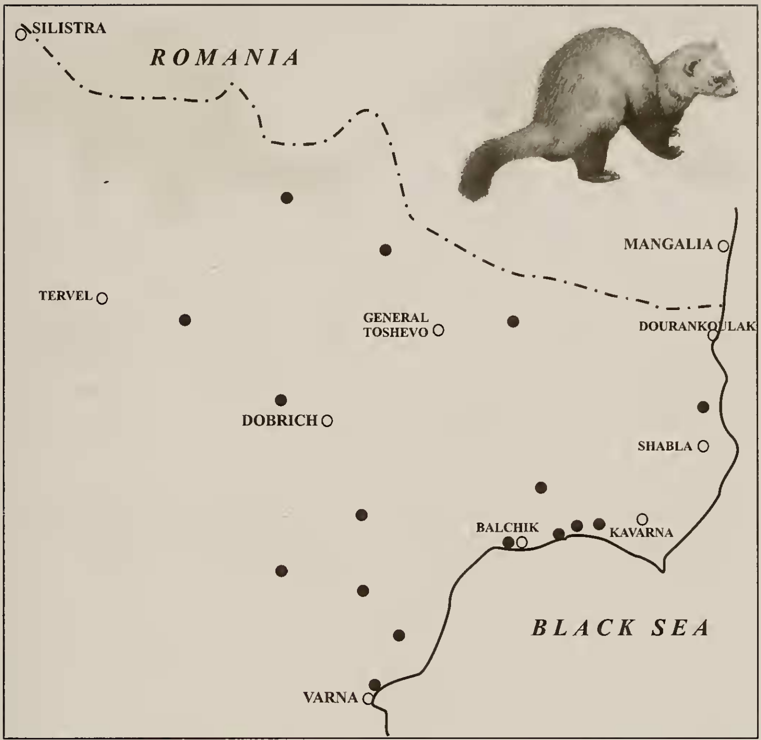


Fig. 6. Russian polecat (*Mustela eversmani*) in Dobrudja after the questionnaire

received through interviews and practically there was no unanswered questionnaire. Therefore it is unclear whether the absence of data on the occurrence of Marbled polecat in the central parts of Dobrudja (around the town of Dobrich) is due to the species extinction or to the greater number of unanswered questionnaires in the region (see the map). However, it can be assumed that there is a trend of decline of the species numbers in certain parts of Central Dobrudja (for example, around General Toshevo) if we judge by the number of answered questionnaires. A possible explanation for this might be the extremely intensive agricultural practices in these regions, which affect negatively the species habitats.

Status of the other small carnivores. Serious concern rises the very low number of the answers about the occurrence of Russian polecat (Steppe polecat) (*Mustela eversmanni*) in Dobrudja (Fig. 6). Recently the species seems to have dramatically reduced its number everywhere within its European range. It is not impossible that some European polecats might have been mistaken for Russian polecats, but in general the ratio between the answers about the two species indicates a sufficient reliability of the questionnaire (one personal observation is reported from the region of Kamen Briag - 1999).

According to the data from the questionnaires, the European polecat (*Mustela putorius*) population in Dobrudja (Fig. 7) and Western Bulgaria is in

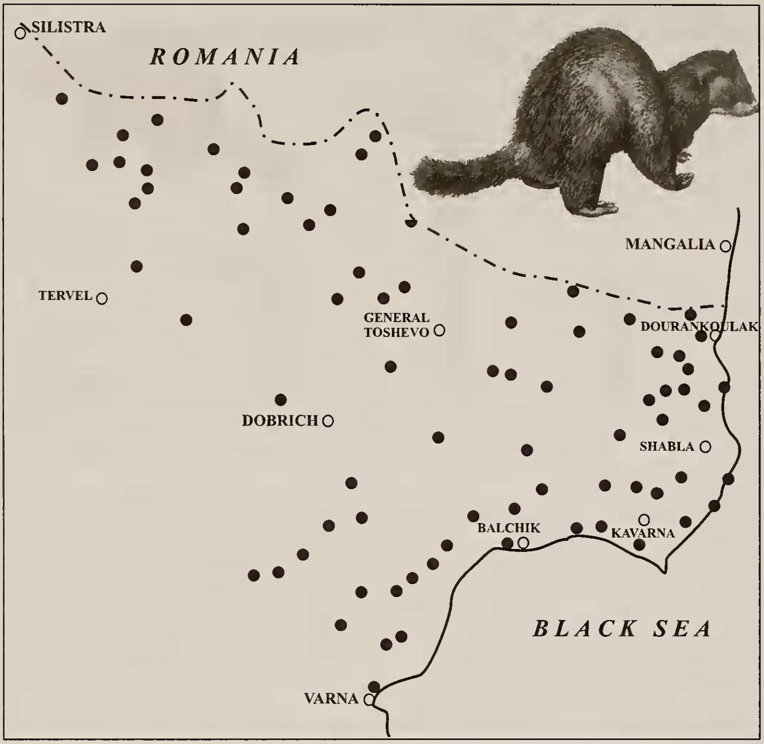


Fig. 7. European polecat (*Mustela putorius*) in Dobrudja after the questionnaire

the highest number relatively. The population of the Stone marten (*Martes foina*), which has been in expansion in the recent years also, has an optimal status (Fig. 8). These conclusions were confirmed by the data from the fur stores and by direct observations in the recent years.

Habitats and competition among the species. The most numerous reports on observations of the Marbled polecat are the ones concerning the following habitat types: 1. house backyards; 2. stony open spaces; 3. abandoned (waste) lands.

The high number of answers for occurrence of the species in the yards, mentioned about the other polecats as well, (Fig. 9, 10 and 11) must be due to the fact that the highest probability to find these animals is where people spend most of their time. Nevertheless, this indicates the synanthropisation of the mentioned species, which look for an easy prey in people's yards. This also explains the high number of answers according to which all three species of polecats are killed mainly for the damages they cause. The higher numbers and maybe the higher synanthropy of the European polecat seem to be confirmed by the answers to the same question.

The significant number of cases of observation of the Marbled polecat in abandoned lands and stony open spaces (including observation around waste dumps) is impressive (Fig. 9, 10, 11 and Fig. 12, 13, 14). This confirms existing

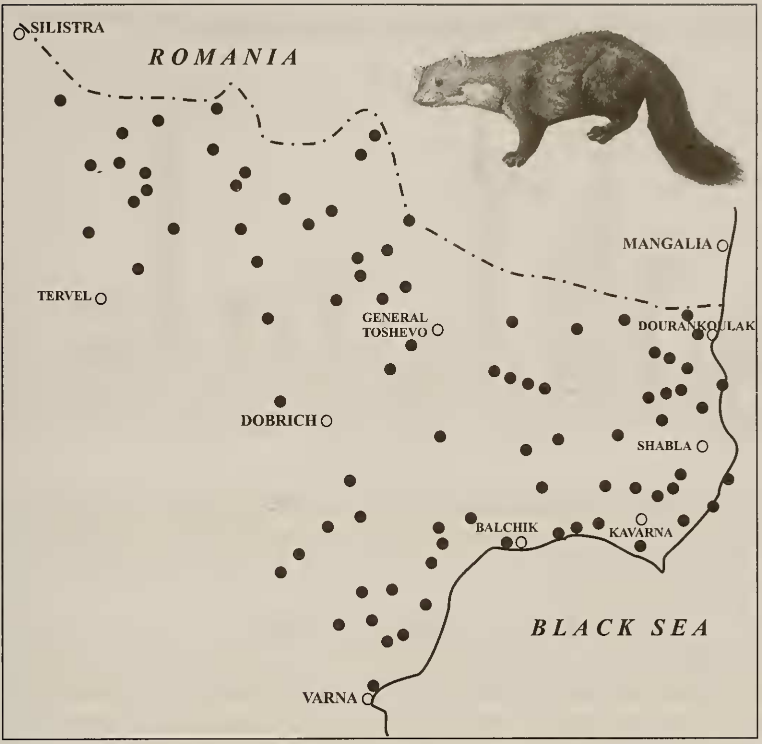
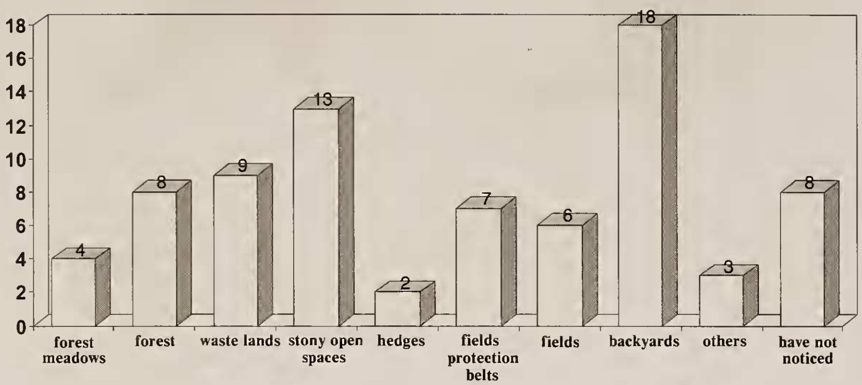


Fig. 8. Stone marten (*Martes foina*) in Dobrudja after the questionnaire

data from the relevant literature. Apparently the abandoned lands and pastures are better habitats for the marbled and the Russian polecats than the cultivated lands. The percentage of occurrence of the European polecat in forested areas is higher, which is logical and confirms the data from the relevant literature and the assumptions about its biology, the preferred prey and habitats. Nevertheless, the high density of the European polecat population and its presence in the regions inhabited by the Russian and the Marbled polecats probably leads to competitive relations the extent of which is worth an in-depth studying. The Russian polecat is probably in direct competitive relations with the Marbled polecat (see below the distribution of the colonial rodents), which is also mentioned in the relevant literature (SPASSOV & SPIRIDONOV, 1993). One Russian polecat (*M. eversmanni*) was captured near Kamen Briag in 1999 (SPASSOV, 1999) and two young Marbled polecats were captured in the same region, in natural conditions in 2000.

Negative factors. In spite of the obviously high percentage of marbled and Russian polecats killed because of the damages caused by them, most of the respondents believe that the main reason for the extermination of the Marbled polecat (and the two other polecat species) is "occasional" trapping. Obviously the falling in traps, set for Stone martens and European polecats, and sometimes deliberately set for the protection of domestic birds in yards,

Fig. 9. Where have you seen a Marbled polecat in your region?



is a factor with a strong negative effect on the species. Other factors are the use of chemicals against rodents and the car accidents (Fig. 15, 16 and 17). In general, the latter seems to be a factor of a significant impact on the small carnivores' populations.

The use of chemicals against pest rodents, as it could be supposed, is one of the main negative factors according to the respondents (Fig. 18). Nevertheless, the Marbled polecat, and seemingly the Russian polecat as well, have in most regions survived the big campaign in 1987-1988 when large quantities of poison were scattered at random to fight the calamity of rodents. It is difficult to judge from the questionnaires to what extent this action had a pernicious influence on the populations. The increase in the number of cases of observations of the Marbled polecat in the period from before 1990 to the recent years is difficult to be evaluated in terms of statistical reliability and might be due to the insufficient number of answers. It is striking that the cases of observation of the two other species were the smallest in number between 1980 and 1990,

Fig. 10. Where have you seen a Steppe polecat in your region?

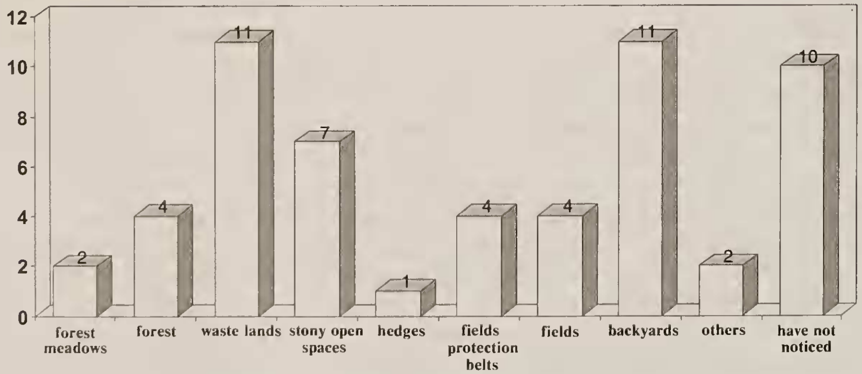
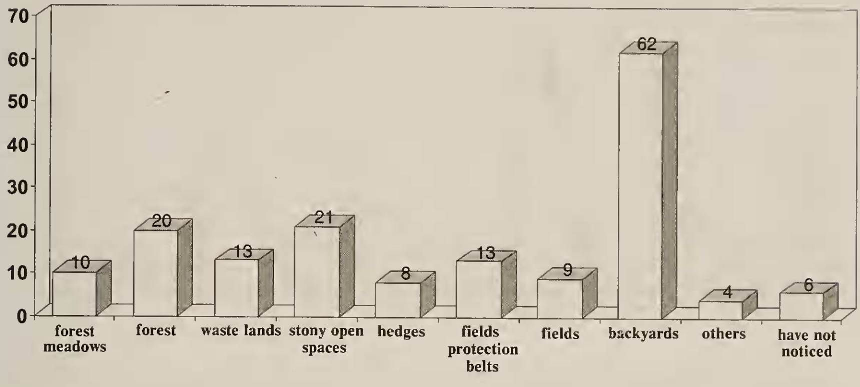


Fig. 11. Where have you seen a European polecat in your region?



which can be interpreted, although slightly biased, as a reduction in number as a result of the big action with chemicals in the 1980's.

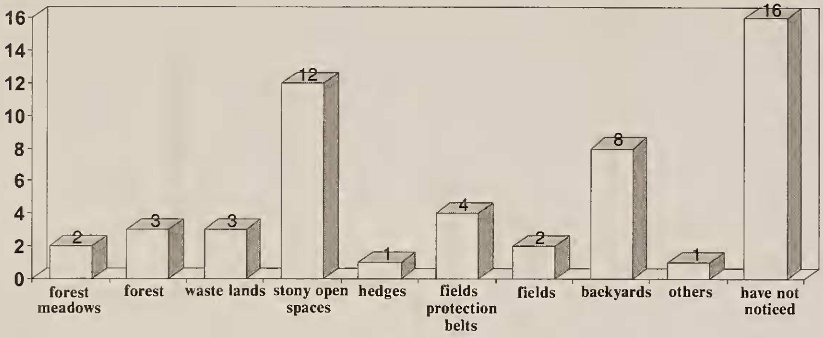
Colonial rodents

Given the high probability of mistakes in the identification of the two Dobrudja hamsters (*Cricetus cricetus* and *Mesocricetus newtoni*), general question about their occurrence was posed in the questionnaires. The number of the hamsters' localities in the region of Dobrudja is considerably lesser than that of the souslik (*Spermophilus citellus*) (Fig. 19 and 20) which supports the existing zoological field studies in the region. I. Boyadjiev and N. Ivanova observed a common hamster (*Cricetus cricetus*) in the region near the village of Kamen Briag in 1999. The questionnaire gives data about the distribution of colonial rodents included in the Red Data Book of Bulgaria and constantly decreasing in number in all of its European habitats. The European souslik with a number of localities in Dobrudja and Western Bulgaria (Fig. 2) is included in the 1996 IUCN Red List. These data could be important for future monitoring and specialised studies in the region.

It is important to note that the places where large colonial rodents are predominantly reported overlap with the distribution of the marbled and the Russian polecats. This is extremely evident in the case of the souslik, which occurs in larger numbers.

There are regions where hamsters (as a whole) occurred in the recent past, but not any more (for example relatively near to the Black Sea coast). It is difficult to assess how much the souslik population has decreased in number and how much it was affected by the use of chemicals. Having in mind the wide use of chemicals it can be assumed that this factor has had a significant negative effect. According to the information given by farmers in the region of Trun (Western Bulgaria) the species almost does not occur in regions where it had mass presence 10-20 years ago.

Fig. 12. Where in your region have you noticed Marbled polecat's dens or female with cubs?



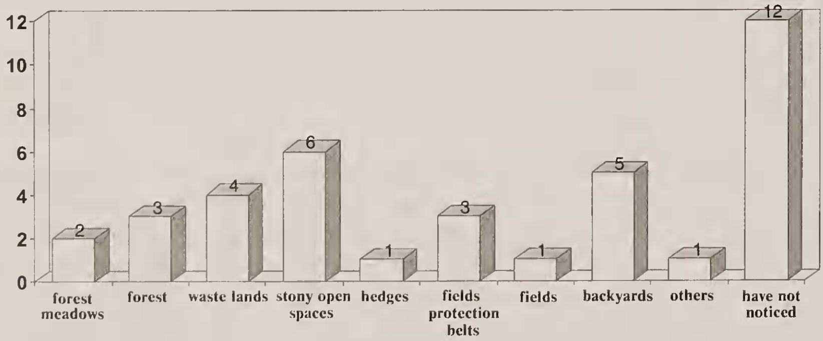
A Draft Framework Management Plan for the Marbled polecat Population in Bulgaria

1. Expand the questionnaire survey of the Wilderness Fund to study the status of the Marbled polecat on the whole territory of Bulgaria and in the neighbouring countries.

2. Carry out field ecological studies on the largely unknown biology and ethology of the Marbled polecat and a more detailed study on its feeding behaviour and its competitive relations with other carnivores.

3. Monitor the status of the souslik[2], as well as of the European, the Russian and the Marbled polecats in model areas with the assistance of the Regional Environmental Inspectorate of the MOEW and the Union of Hunters and Fishermen.

Fig. 13. Where in your region have you noticed Steppe polecat dens or female with cubs?



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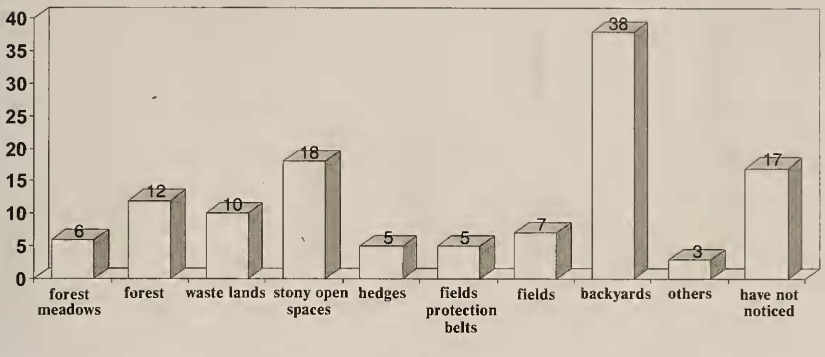
[2] a species of the IUCN Red List and possible optimal prey for the marbled polecat.

Fig. 14. Where in your region have you noticed European polecat dens or female with cubs?



4. Establish new protected areas in some larger abandoned lands:

- Enlarge the Kaliakra reserve where some native steppe elements and biotopes closest to the primary biotopes of the species are preserved.
- Declare a Nature park in the region of the northern Black Sea coast covering areas with a different use status in order to protect the preserved natural steppe elements and to create conditions for territorial conservation of the species.

5. Awareness raising campaign among the local population in relation to the protection of the Marbled polecat and promotion of the importance of the Bulgarian population for the species conservation in Europe.

6. Preservation of the field protection belts in southern Dobrudja and efficient ban on burning the hedges where they exist.

7. Develop and introduce methods of alternative use of chemicals for coping with the calamities caused by rodents.

8. Exercise efficient control on the trapping ban.

9. Look for ways and means of efficient isolation (nets, tunnels for small animals) of parts of the road network in the region, especially in the most traffic-intensive sections.

Fig. 15. According to you, what are the reasons for the extermination of the Marbled polecat?

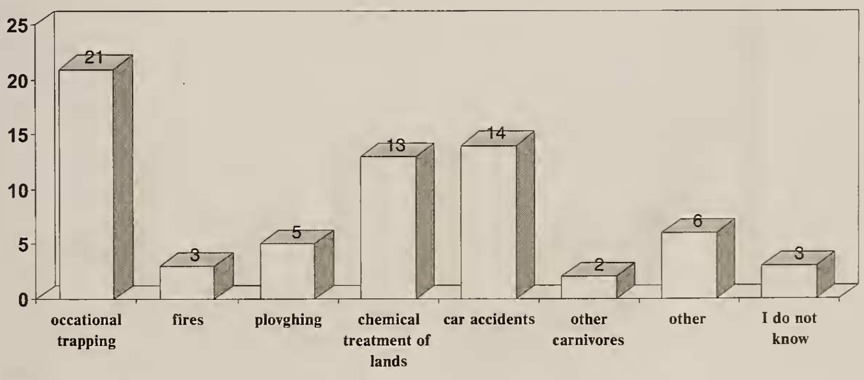
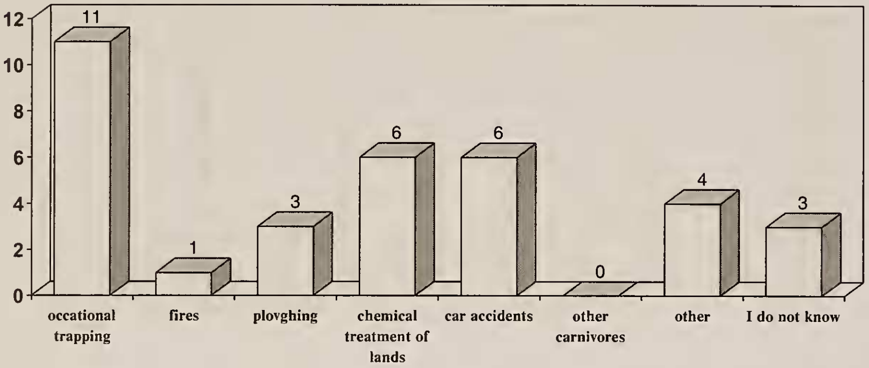


Fig. 16. According to you, what are the reasons for the extermination of the Steppe polecat?

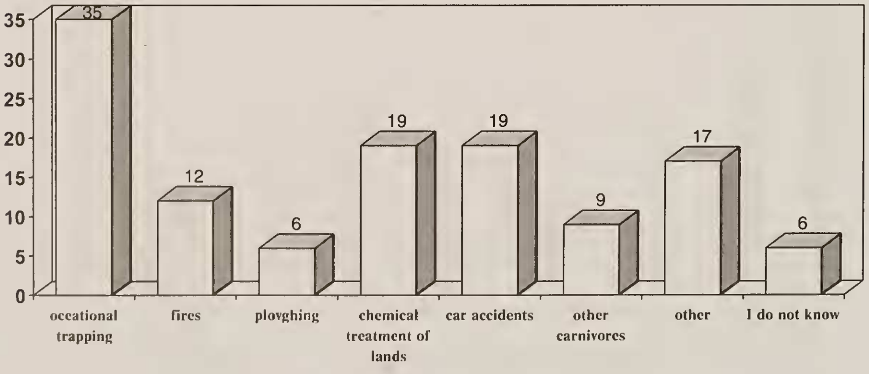


10. Establishment of a network of zoos interested in breeding the species in captivity in order to help its reintroduction in suitable natural areas in Bulgaria and other countries to enhance the existing populations. The implementation of the project of the Wilderness Fund for a station for captive breeding and observation of the species will also contribute to that effect.

11. Co-ordinate the Bulgarian efforts for the conservation of the species with the Action Plan for the European Marbled polecat of the Mustelidae, Viverridae and Procyonidae Specialist Group to IUCN/SSC. Initiating the establishment of an European network for research and conservation of the European Marbled polecat.

This Action Plan might serve as the basis for a regional plan including Bulgaria's neighbouring countries, and thus become an element of the European Action Plan for the conservation of the European Marbled polecat.

Fig. 17. According to you, what are the reasons for the extermination of the European polecat?



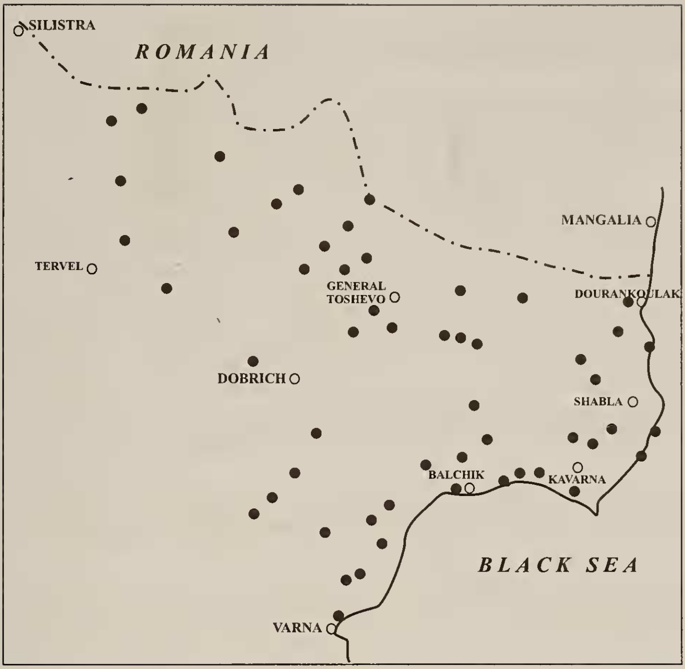


Fig. 18. Chemical treatment in Dobrudja

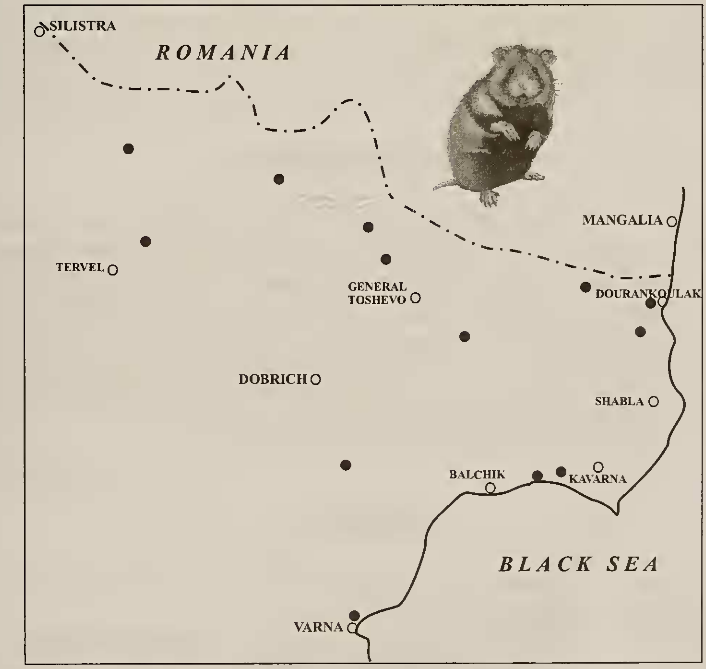


Fig. 19. Hamsters (*Cricetus cricetus* and *Mesocricetus newtoni*) in Dobrudja after the questionnaire

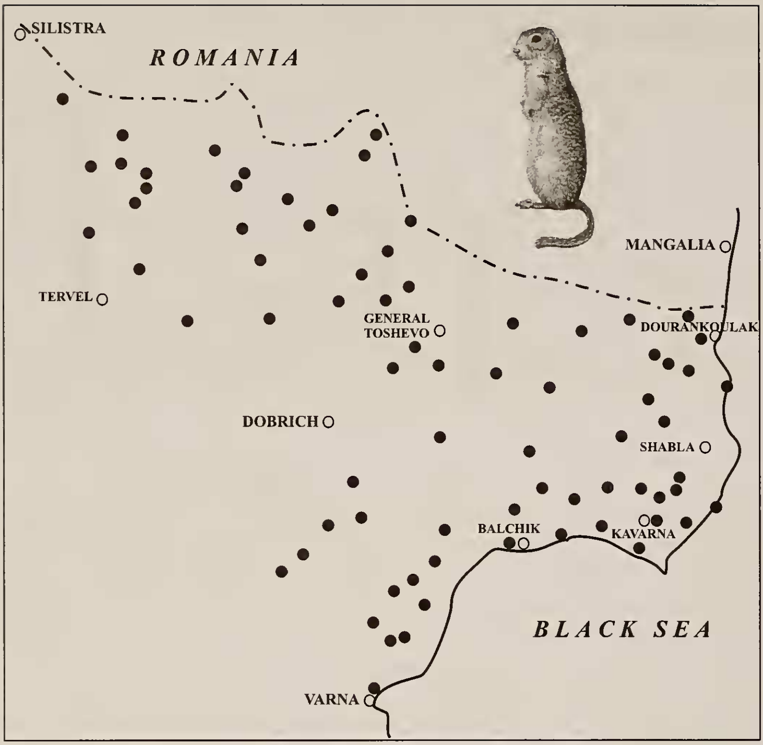


Fig. 20. European souslik (*Spermophilus citellus*) in Dobrudja after the questionnaire

Acknowledgements

This study is a part of a project of the Wilderness Fund Society implemented within the Bulgarian-Swiss Biodiversity Conservation Programme. The Swiss Agency for Development and Co-operation supported the project. Special thanks to Geko Spiridonov, Mira Mileva, and Boriana Mihova who contributed to the realisation of this project; Joana Staleva for the statistical processing of the data collected through the questionnaire; Atanas Stoev for the computer processing; Julieta Penchovska - sociologist, who helped with the elaboration of the questionnaire.

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Received on 01.10.2001

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Състояние на пъстрия пор (*Vormela peregusna peregusna* Guldenstaedt) в Западна и Североизточна България и данни за видовете приемани за негови основни жертви и конкуренти

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(Резюме)

Съвременното състояние на европейския пъстър пор (*Vormela peregusna peregusna* Guldenstaedt), неговата екология и етология са почти неизучени, а тези знания са особено важни за опазването на популацията на подвида, включен в Червените списъци на IUCN от 1996 и 2000 год. Целите на това изследване са очертани от консервационната значимост на европейския пъстър пор и свързаните с това проучвания и проекти за опазването му в България.

Проучването е проведено в Южна Добруджа и Западна България през 1996 - 1997 год. като са използвани въпросници. Събрана е информация за миналото и настоящото разпространение на вида, неговия брой, местообитанията, отрицателно влияещите фактори, както и за животните, свързани с биологията му. Анкетните данни говорят за относително чести наблюдения на пъстрия пор в Западна България и Добруджа, което предполага близка до нормалната численост и плътност на популацията в тези райони. Най-големият брой наблюдения са в пустеещи земи и в открити каменисти пространства. Същевременно видът е уязвим от редица човешки дейности. Често животните загиват в капани, поставяни за предпазване на домашните птици от дребни хищници.

На основата на резултатите от проучването на състоянието на вида и факторите, които му влияят, е разработен проект на рамков план за управление на популацията в България.